Internet of Things as a way to increase energy efficiency in manufacturing companies: State of the art and an evaluation methodology

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Abstract

Increasing energy costs, "greener" consumer behavior and environmental legislation are driving efforts toward sustainable manufacturing. In this scenario, the enhanced awareness of actual energy consumption represents an essential step to support energy-efficient decision-making in production management. The Internet of Things (IoT) technology appears to be a powerful enabler for better visibility and awareness, thanks to smart sensors and smart meters at the machine level which can collect energy consumption data from production systems almost in real time. This paper aims to provide a short review of the current State-of-the art in adopting IoT for collecting energy consumption data. Then it presents a methodology to help managers to implement IoT: the proposed methodology includes an analysis of the current energy management system existing in the company, so as to understand the present situation, defines the expected benefits, recommends procedures for implementing IoT to collect energy data and eventually suggests how to integrate the collected data in production management decisions at operational level. In order to test the methodology a pilot study was started, and energy KPIs will be used to evaluate the achieved improvement in energy efficiency, and hence the effectiveness of the proposed methodology.

Keywords: Internet of Things, Methodology, Energy consumption awareness, Energy management, Production management decisions.